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F4S

(71) Applicant

Geoffrey Parkin,
South View, Barrowby
Lane, Austhorpe, Leeds
15, Yorkshire

(72) Inventor

Geoffrey Parkin

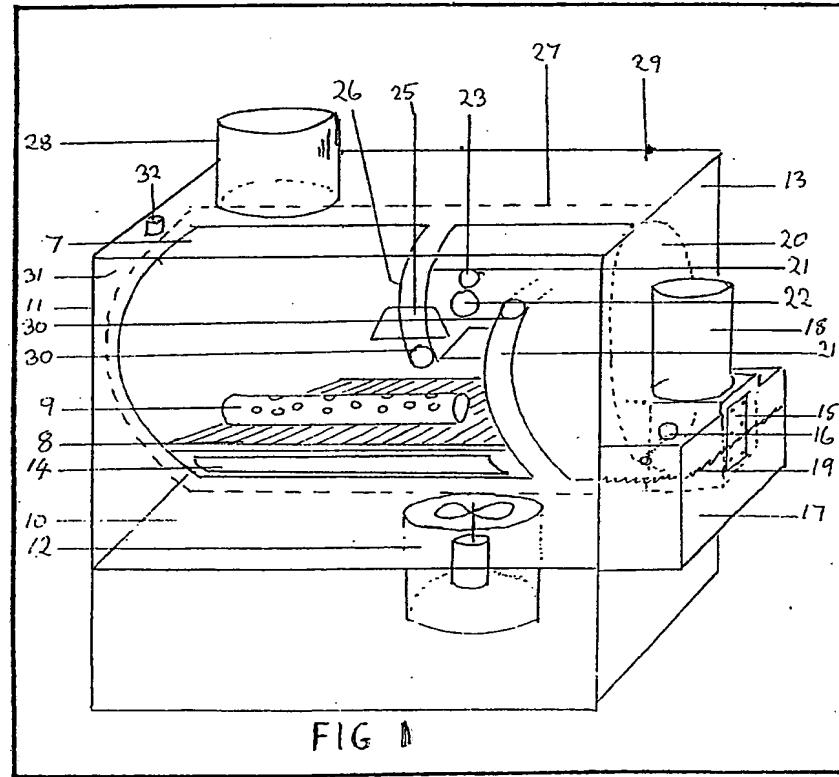
(74) Agent

G. Parkin,
South View, Barrowby
Lane, Austhorpe, Leeds
15, Yorkshire

(54) Incinerator/Heater

(57) The invention relates to an incinerator/heater providing substantially a chamber 7 within which combustible products may be burned in air and passing a stream of air over the surface heated by the combustion and transferring the thus heated air to the space required to be heated. A primary aspect of the invention is the means provided to burn the smoke produced by solid fuel

combustion by the utilisation of a smoke burning adaptor 9 and smoke directing baffles thus giving increased output and clean emission from the chimney. Air for heating is propelled across the heated surfaces by means of a fan 12. Solid fuel is introduced into the chamber by a loading door at the front. Emission gasses are released after utilisation of the heat through the flue exit 18 at the rear. The system can be utilised for heating either air or water and steam.



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4 SHEET 1

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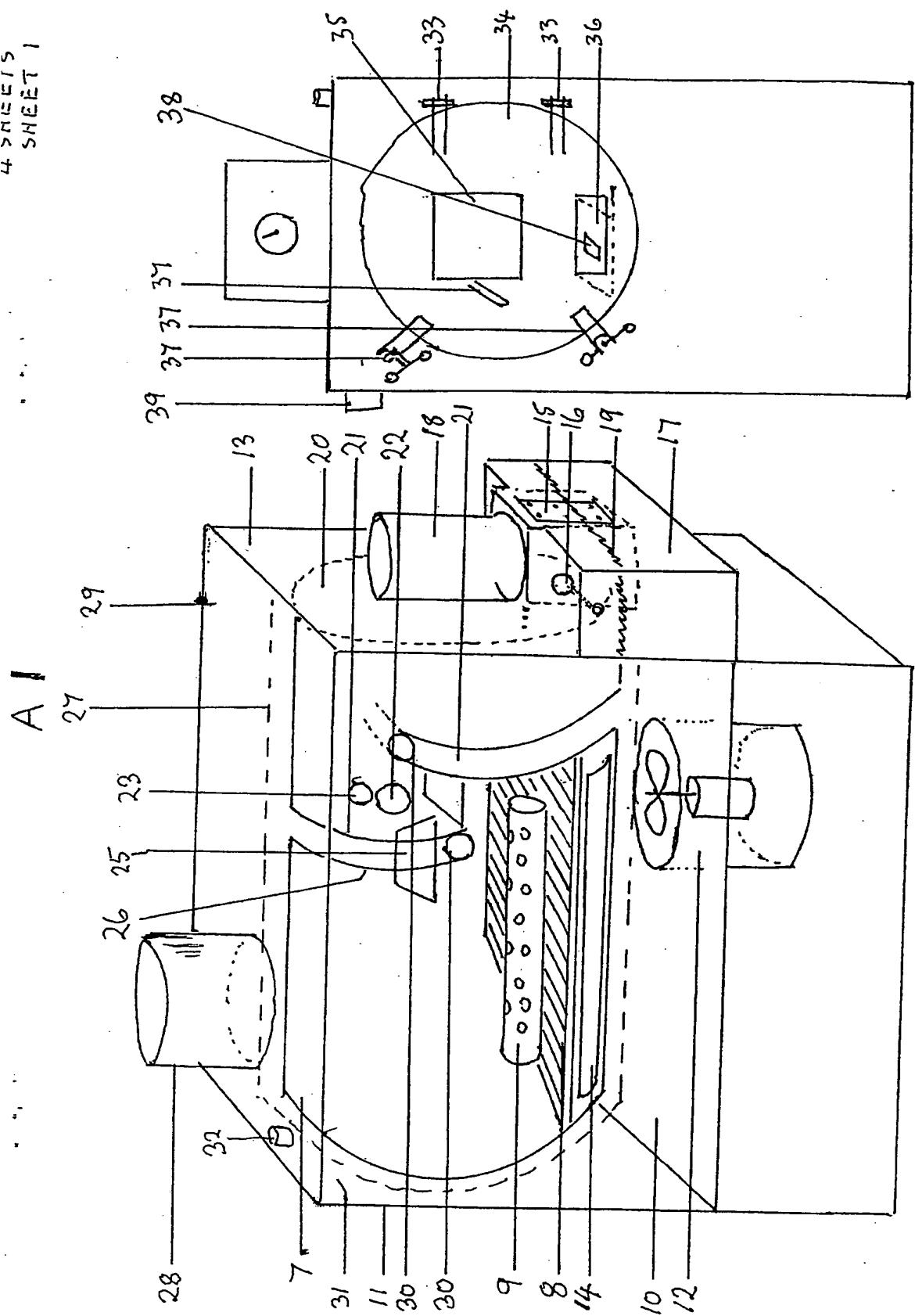
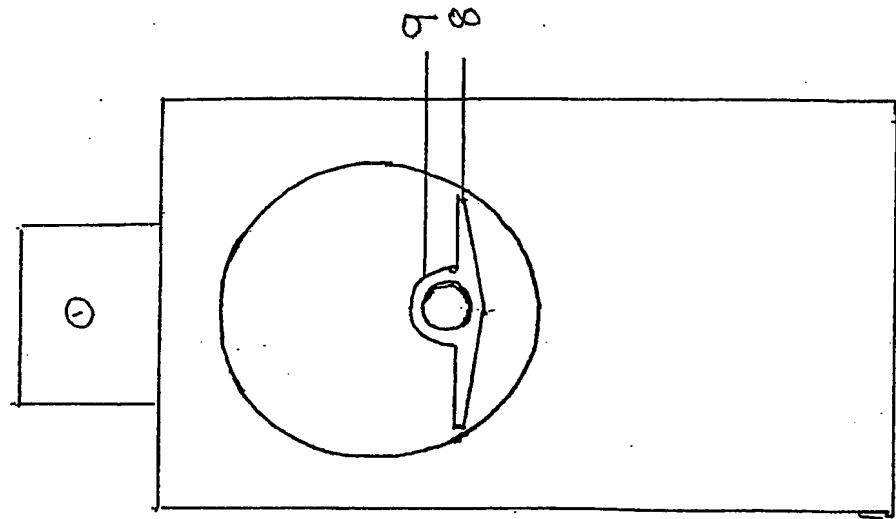


FIG 3

FIG 1

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SHINE 2



2
B

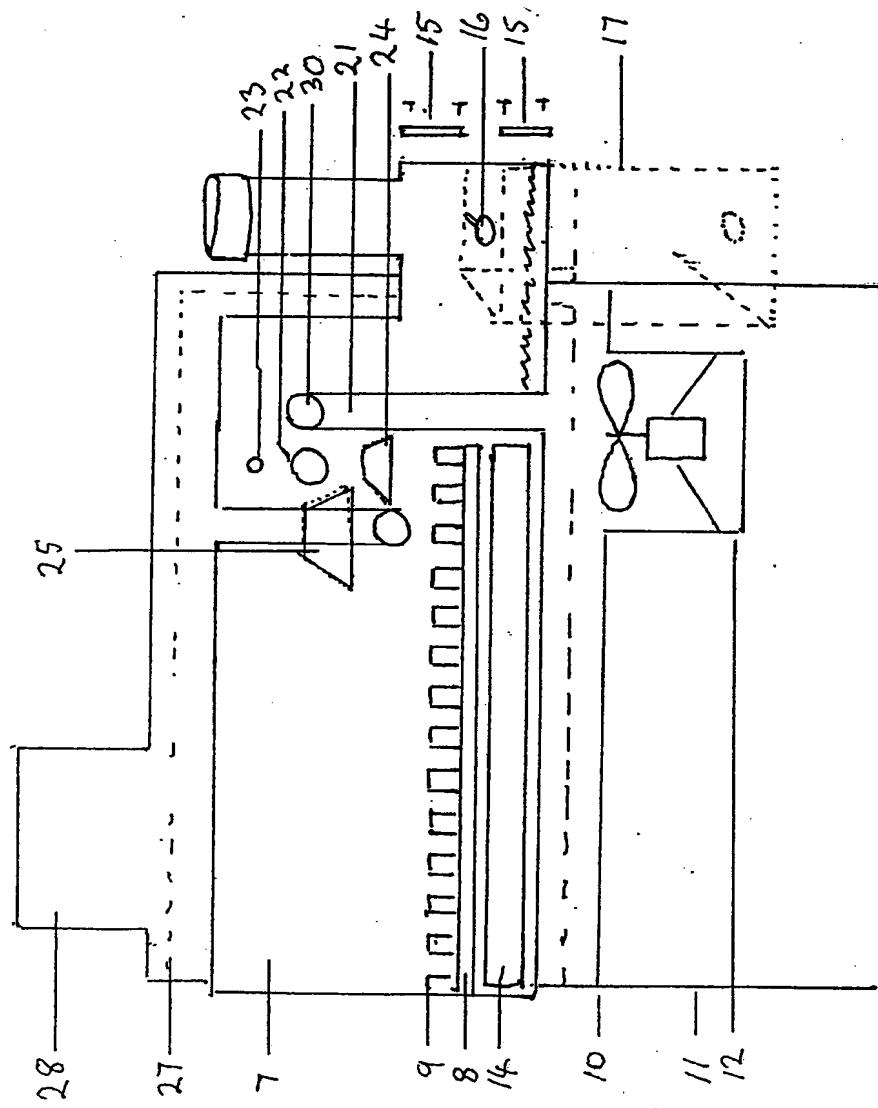
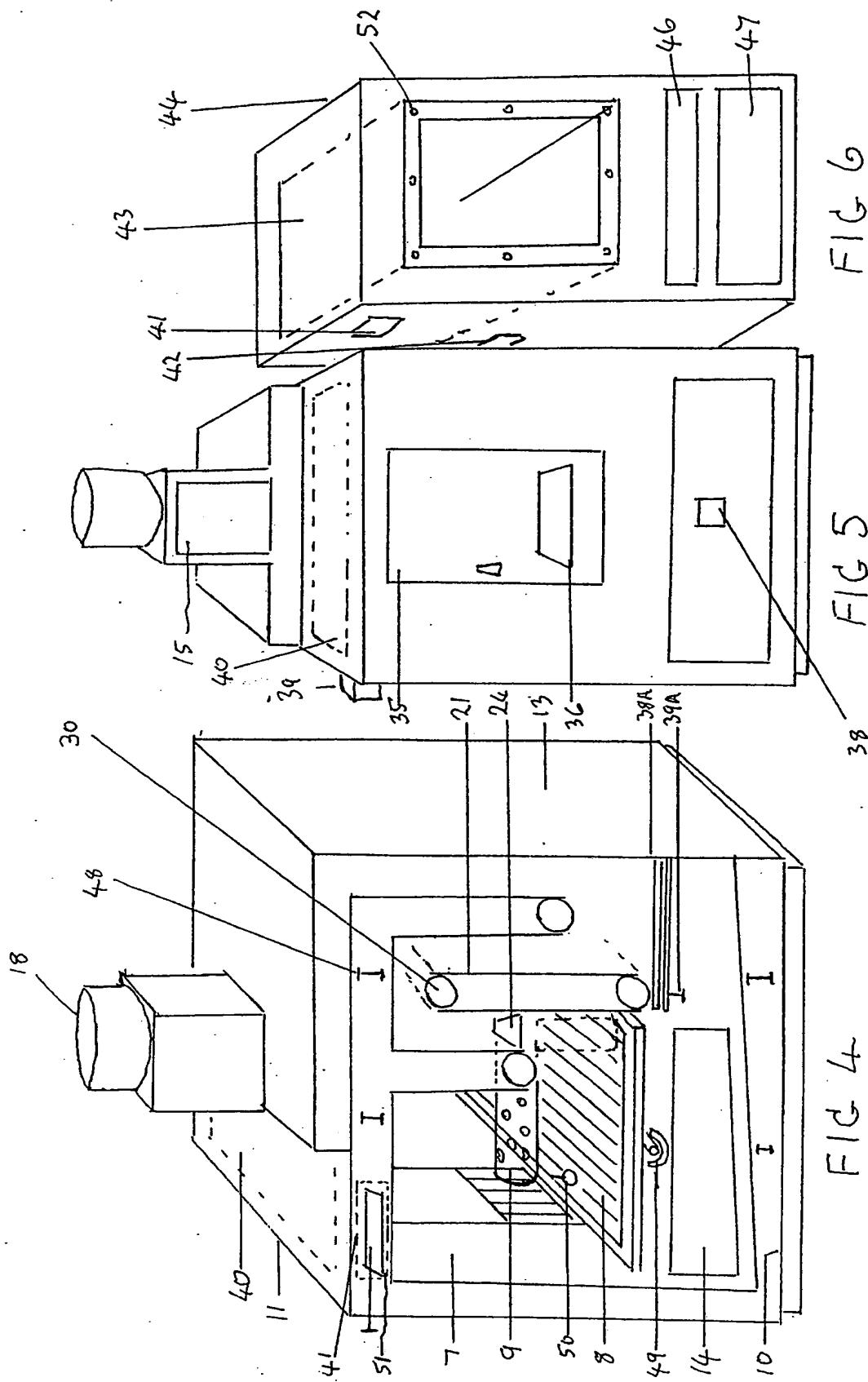


FIG 2

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4 SHEETS
SHEET 3

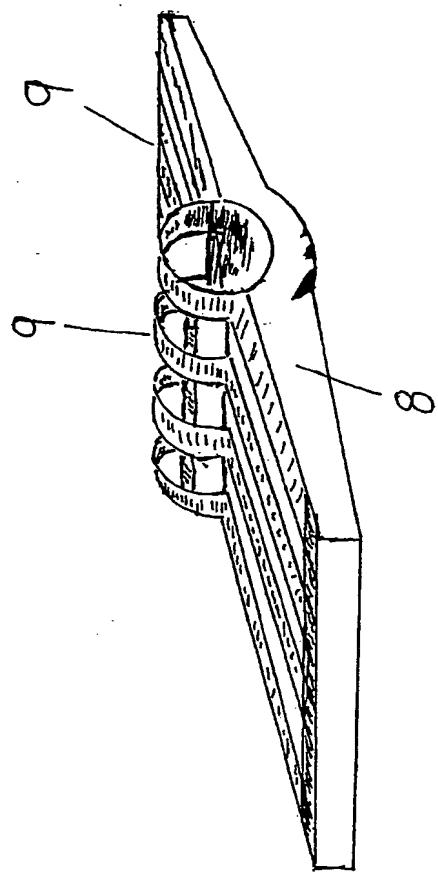
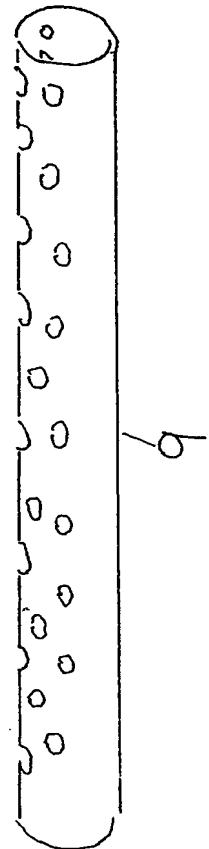
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SHEET 4

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SPECIFICATION
Incinerator Heater

Whereas it has been known hitherto to heat a stream of air so that the hot air may be used for heating an enclosed or open space, by burning a fluid fuel in the air stream, this form of space heating suffers from the disadvantage that the products of combustion also enter the space with the possible disadvantages of fire hazard, 5 poisoning of any occupants of the space or of smoke nuisance, and it is an object of the invention to eliminate the above mentioned disadvantages.

According to one aspect of the invention there 15 is provided means for space heating comprising a chamber within which combustible materials may be burned in air, the chamber having at least one air inlet and an outlet for the products of combustion, and means whereby air may be 20 brought into thermal contact with the outside of the chamber to be heated thereby and removed therefrom in a stream. Preferably the said means comprises a jacket substantially enclosing the chamber and being provided with an air inlet 25 and means an air outlet means and blower means.

According to a further aspect of the invention there is provided a method of space heating comprising burning solid fuel in air in a 30 combustion chamber and removing the products of combustion passing a stream of air over the surface of the chamber for heating by the combustion occurring therein and transferring the thus heated air or water to the space required to be heated. Preferably the solid fuel comprises 35 waste material such as wood shavings, cardboard or paper and coal.

A further aspect of the invention is the flue outlet which utilises heat which is normally lost on a direct flue outlet by continuing to heat 40 surfaces after it has left the actual fire chamber. This also applies to the positioning of an after-burner which may be fitted for burning smoke on initial lighting.

The units can be made on cylindrical or 45 rectangular lines to give heat by hot air hot water steam or for cooking, in various sizes and measurements.

Embodiments of the invention will now be described by way of example and with reference 50 to the accompanying drawings of which:

Fig. 1 is a perspective view

Fig. 2 is a vertical section through the longitudinal axis

Fig. 3 is a front view

Fig. 4 is a perspective view

Fig. 5 is a front view

Fig. 6 is a perspective view of optional oven section

Figures 1—3 relate to industrial or heavy 60 domestic use

Figures 4—6 relate to light or medium domestic use.

As shown in figure 1 the incinerator heater comprises a combustion chamber 7 surrounded

65 by an air jacket made up by plates 11, 13, 31 or water jacket 27. Water inlets and outlets are located on the rear and top respectively as required.

The combustion chamber 7 can comprise of 70 either a cylinder as in Fig. 1 or on rectangular lines as in Fig. 4, having a door 34 hinged to front plate 11 with optional secondary loading door 35 hinged to main door 34.

The front plate 11 also forms, with rear plate 75 13 base plate 10 and side plates 31, a jacket whereby air may be entrained around the outer surface of the combustion chamber 7 or alternatively may be used as a cover round water jacket 27.

80 Solid fuel is introduced into the combustion chamber 7 in use of the apparatus through door 34 or 35 and burned therein in air which is introduced through port 36 or alternatively by fan assistance through port 38. Fan assisted air intake is controlled by thermostat 39. Products of combustion including flame and smoke first travel 85 through smoke burning adaptor 9 which emits flame at the rear. This flame in turn helps to burn smoke directed into its path by baffles 24. Waste gasses then pass through emission escape chamber over heating surfaces 21 and escape out through chimney 18.

On initial lighting smoke emission can be reduced by an after burner connected at 22 which 95 in turn continues to heat surfaces 21. The function of the after burner may be inspected through inspection glass 23.

Particles of grit can be collected by water trap 19 which is fed from tank 17 the level being 100 controlled by ball-cock valve 16. Any collection of grit can be cleaned through clean out apertures sealed by removal plates 15.

Air for heating as opposed to air for combustion is drawn into the air jacket through 105 inlet 12 by means of a fan and is driven out through outlet 28. Whilst the air is entrained in the space between the jacket and the combustion chamber and heating surfaces 21 it is heated by conduction over the wall of the combustion

110 chamber 7 and heating surfaces 21 without being contaminated by products of combustion.

On rectangular light domestic water boilers, water inlets and outlets are connected to plates 31 as required. A boiling plate 40 may be added, 115 heat travelling through 41 controlled by flap 51 to oven (fig. 6) round oven compartment 43 encased by 44 and returning through outlet 42 into emission escape chamber and continuing to heat surfaces 21. The oven is closed by door 45 which

120 has an inset support 46 when lowered. Under the oven is a warming space 47. Inside the oven is an air expansion outlet 52. The oven unit (fig. 6) may be bolted onto the boiler unit (fig. 4). The oven unit can be removed by releasing screws 52 for 125 cleaning purposes. Ash in the combustion chamber can be shaken through grates 8 by lever 50 which is connected to grate support on a pivot 49. The ash then drops into ash pan 14. The emission escape chamber may be cleaned out by

releasing winged nuts 39 thus releasing flap 38. Flue outlet 18 is cleaned through removable cover 15.

Diagrams

5 Fig. 1 is a perspective view
 Fig. 2 is a vertical section through the longitudinal axis
 Fig. 3 is a front view

These Drawings Relate to Industrial or Heavy
 10 Domestic Application.

Fig. 4 is a perspective view
 Fig. 5 is a front view
 Fig. 6 is a perspective view of optional oven section

15 These Drawings Relate to Light or Medium Domestic Application

Interpretation

7. Combustion Chamber
 8. Grates
 20 9. Smoke burning adaptor
 10. Base plate
 11. Front plate
 12. Air inlet duct and fan housing
 13. Rear plate
 25 14. Ash pan
 15. Removable plates for clean-out and inspection
 16. Ball cock water valve
 17. Water tank
 30 18. Flue outlet
 19. Water Bed
 20. Rear plate of combustion chamber
 21. Area for heat exchange
 22. Aperture for after burner
 35 23. Aperture for inspection glass
 24. Smoke baffle plates
 25. Air flow baffle plates
 26. Fire box back plate
 27. Water Jacket
 40 28. Hot air outlet
 29. Top plate
 30. Strengthening Tubes
 31. Side plate
 32. Coil thermostat
 45 33. Door hinges
 34. Primary loading door

50 35. Secondary loading door
 36. Air intake flap
 37. Door securing brackets
 38. Mounting for air intake fan
 39. Fan control thermostat
 40. Hot plate
 41. Outlet to oven section
 42. Return from oven section
 55 43. Oven inner casing
 44. Outer casing
 45. Oven door
 46. Oven door stabilising section
 47. Warming compartment
 60 48. Anti expansion plates
 49. Grate support on pivot
 50. Leaver for rocking grates
 51. Oven control Flap

Claims

65 1. By burning any type of combustible material, and burning all exhaust gasses produced thereby, in air and transferring the heat produced across metal surfaces, a volume of air forced across the metal surfaces whilst kept separate from the
 70 combustion chamber and entrained between the combustion chamber and an outer metal casing may be heated to a pre-selected temperature, using an air thermostat to control the flow of air, and be used for space-heating purposes without
 75 any pollution or noxious gasses produced by the combustion process entering the stream of heated air.
 1a. As described in claim 1 all exhaust gasses from the normal combustion of solid fuels usually emitted as smoke are burnt away by virtue of the unique design of the smoke burning adaptor and smoke directing baffles. Products of combustion including flames and smoke first travel through smoke burning adaptor which emits flame at the
 80 rear. This flame in turn helps to burn smoke directed into its path by the smoke directing baffles situated in the rear of the chamber. The smoke burning adaptor may be moulded into the sectional grates in units where grates are used.
 85 2b. As described in claim 1 the removable sectional grates and under-draught bottom-burning principle allow for the burning of most combustible materials including domestic and industrial waste, whether they are burned alone or in conjunction with other materials.